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THE U. P. A. S. I.

(INCORPORATED.)

Contents

The Government Entomologist continues his report in this number and it is hoped that every advantage will be taken of his able assistance and advice which will add so much to our knowledge of the pollination of Coffee—and those Districts named in his report, are especially asked to give him timely warning of rain, so that his arrangements can be made.

The Scientific Officer writes on the subject of the checking of Fertiliser guarantees and gives advice as to the best method of taking samples and it is to be noted that the samples should be sent to this office not later than March 20th if possible.

A Paper read before the Agricultural Society of Trinidad and Tobago on the use of explosives is largely reproduced. Though dealing mostly with Cocoanuts and Fruit trees, many useful suggestions are given as to the opening of land from which much may be learnt; and an article of an experiment made with dynamite in growing tea will be of much interest to all Tea Planters. It is suggested that as regards cost, dynamite cannot compete with manual labour in the tea districts, but it is rather too early to form a decided opinion on this point, and it is to be hoped that the experiment will be continued. If the cost can be curtailed one cannot but foresee the happiest results.

Messrs. Schimmele's report on Cardamomus will be of interest to Cardamom growers, and if caution is exercised in the selection of seed there is no reason why their cultivation should not, as a bye-product, continue to pay—as the export to England is increasing for the extraction of oil.

Mr. Carson-Parker, the United Planters' Association's Representative on the Tea Cess Committee wrote a letter to the Chairman, which we publish for the information of all Planters.

We regret that we have no more letters on the Labour Question to publish this week. The subject is so important that we hope that we may receive more, that will shed a ray of light on this vexed question.

BEEES AND THE FERTILISATION OF COFFEE.

[Continued.]

PROPOSED EXPERIMENTS.

On 24th January a letter was received from the Government Entomologist containing suggestions for experiments to be carried out to determine the influence of insects, especially Honey-Bees, on the Pollination of Coffee Flowers. The following are extracts from this letter:—

DISTRICT IN WHICH EXPERIMENTS ARE TO BE MADE.

"The Planting Communities of the Shevaroy Hills, Mysore (Bababudins), and South Coorg are the only ones which have so far signified their desire for these experiments to be undertaken in their respective areas. For the present year, therefore, it is proposed to confine the experiments to the Districts named above.

"I would point out, however, that the value and interest of any experiments and observations of this nature would be considerably enhanced if they could be checked by comparison with similar experiments and observations in other districts (such as the Anamalai Hills and Travancore) where the conditions are apparently more favourable for the successful pollination of coffee. The Planting Communities of these more favoured Districts have not, it is true, seen any necessity for any investigation into this subject, because they are already satisfied with their out-turn, but such investigations would perhaps prove of considerable value in considering the possibility of increasing the out-turn of the less favoured areas.

STAFF REQUIRED TO CARRY OUT THE EXPERIMENTS.

"I think that, to minimise risk of errors, the experiments should be carried out in duplicate in each District. We shall therefore require two observers each in the Shevaroys, Bababudins, and South Coorg.

"As you are aware, I am at present under orders to proceed to Pusa to take over the duties of Imperial Entomologist as soon as I am relieved here at Coimbatore. As to who my successor will be, or when he will arrive, I am as yet without any information but it is probable that he will reach Coimbatore sometime in March. If this is so, it will rather upset the experiments as, if I have got to Pusa just before the Coffee-flowering season, it will be practically impossible for me to leave again at once to come down for these experiments. I might be able to take over charge by telegraph and remain down here until after the experiments, but this course would require special Government sanction. In any case, at present I cannot make any *definite* arrangements about my own share until I hear reliable news about my successor. I would propose however, that:—

(a.) The Government Entomologist (either myself, if still here, or my successor, if he has then arrived) should carry out one set of the experiments in the Shevaroys.

(b.) The Assistant in Mysore (Mr. Frattini) should carry out one set in the Bababudins.

(c.) The Assistant in Coorg (Mr. Jonas) should carry out one set in South Coorg.

"A second experimenter in each District will therefore be required to carry out the duplicate set of experiments, and I shall be glad if you will be good enough to ask the Secretaries of the Planters' Associations concerned to secure a reliable volunteer in each District and to let me know his name and address so that the necessary apparatus may be sent to him direct,

"Should I be relieved before the Flowering season and allowed to stay down here to carry out these experiments, I would suggest that I should myself revisit the Polibetta District in Coorg and make an extra set of experiments and observations in that District. As, however, it is at present doubtful whether this will be possible I cannot offer to replace one of the regular experimenters and my functions would only be *supplementary* to theirs.

TIME OF FLOWERING SEASON.

"I understand that the Flowering season of Coffee, which is very short—only of three or four days' duration at the utmost—follows about ten days after the early rains, commonly called Blossom Showers, and that these usually arrive any time between about 20th March and 10th April.

"I do not know whether there is much variation in the coincidence of these Blossom Showers in the three districts concerned, but I would recommend that the Secretaries of the Planters' Associations concerned should inform me by telegraph (a) when the banking of clouds seem to herald the approach of these showers, and (b) when the showers actually fall, giving in the second case an estimate of the date on which the blossom will be open.

From here the Shevaroys are distant roughly one day, the Bababudias three days, and South Coorg four days, and the experimenters and observers should be ready two or three days before-hand. At the same time the Secretaries should similarly warn the local Assistants and Volunteer Helpers to be in readiness.

"The first information required above under heading (a) would enable me to get touring-apparatus etc., prepared and, if necessary, to recall to Head Quarters any of my Staff who might then be away and be required for the work.

(To be continued.)

The *Statesman* writes in its issue of the 1st instant:—"There are few more curious examples of official inconsistency than the attitude of the Indian Government towards indentured labour. Why in the world should a form of coolie-recruiting which is forbidden to the tea planters of Assam, be permitted to the sugar-growers of distant colonies? The question will force itself upon every reader of "Fiji of to-day," a book written by Mr. J. W. Burton and published with an introduction by the Rev. A. T. Small, Chairman of the Methodist Mission in the Islands. Three thousand Indians, Mr. Burton tells us, are needed annually to carry on the business of the colony. The net cost of these human agricultural implements amounts to about £16 an adult inclusive of transit; and in return for this payment, the master obtains the services of a coolie, for five years. "Five years hard labour." Mr. Burton calls the coolie's share of the bargain. Unless his narrative be greatly exaggerated—as we have no reason for supposing it to be—the phrase very inadequately indicates the miseries suffered by some of the victims of indentured immigration. Among them we are told are "men of education, high caste and refinement, who have been inveigled by the glowing tales of recruiting agents in India. They believe these tales and on arrival in the land of promise find themselves drafted to a sugar estate and knocked about by overseers and put to the hardest form of manual labour. Mr. Burton admits that Indians who have served their term and settled down in the island, constitute industrially the most important element in the Fijian community; but this fact does not compensate for the evils disclosed. At its best the indenture system is a degrading method of employment and the sooner the Government puts a stop to it the better.—*Indian Planters' Gazette*,

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Checking of Fertiliser Guarantees.—At the Annual Meeting of the U. P. A. S. I. in 1912 the following resolution proposed by the Delegate for the Bababudans and seconded by the Delegate for Coorg was passed:—

"That the Scientific Department be asked to try and see their way to periodically verify the guaranteed analyses of manures sold by different manure firms. It has been suggested that if the Scientific Officer has too much to do to undertake the analyses that perhaps the Assistants for Mysore and Coorg might be spared for a month in the year to undertake those analyses."

The District Planters' Associations were circulated on the subject and those who accepted this offer intimated that the necessary samples would be sent in during February and March and again in September. It has consequently been arranged that the Scientific Assistant for Mysore will come to Bangalore early in April to assist in the work of checking guarantees. It will be impossible to undertake the work sooner this year as the Scientific Officer will be away on tour during March.

It is proposed when the samples are received to sort them into groups and check the guarantees of each group from the different firms, e. g., Poonacs, Superphosphates, Mixtures, &c. If these bulked samples come up to guarantee, things are evidently as they should be. If they do not the particular sample under guarantee will be discovered. Consequently, every planter who sends a sample will not necessarily receive an analysis of his fertiliser, but the general results will be published in the *Chronicle*.

The samples sent in must be carefully taken so that they truly represent the bulk.

When taking samples out of bags, a number of different bags must be sampled and the samples drawn from different places in each bag; from the bottom of one, the top of the next, the middle of a third and so on. If the manure is in a heap, samples should be drawn in the same way from different places in the heap, not neglecting the interior. The different samples are then thoroughly mixed on a clean bag, or floor, and about 2 lbs. finally put in a *clean* bag, labelled and forwarded for analysis.

In the case of mineral fertilisers like saltpetre, nitrate of soda, &c., about 8 ounces is sufficient for analysis and the sample is conveniently forwarded in a *clean, dry* bottle.

Each sample must be clearly labelled and should be accompanied by a covering letter stating from what firm the manure it represents was bought, its price, and its guarantee. These samples should be sent in not later, if possible, than 20th March addressed to the Secretary, U. P. A. S. I., Bangalore.

A representative number of samples are received with these data valuable figures will be obtained showing the cost and standard of manures usually used on estates in Southern India.

Scientific Officer's Tour.—The Scientific Officer will leave Bangalore on the 22nd February to make a tour of the Lower Palneys and the Kanan Devan Districts. He expects to be away from headquarters five or six weeks. All correspondence should be addressed as usual to Bangalore from where it will be forwarded.

R. D. A.

EXPLOSIVES IN AGRICULTURE.

The use of dynamite in aid of agriculture has interested us greatly and doubtless the Planting Community of Southern India, too, and with the intention of encouraging its adoption or trial, we reproduce a paper read by Mr. Harry Vincent before the Agricultural Society. It is most significant that the use of dynamite has more than doubled the crops in the United States of America. Though the use of dynamite in agriculture has been known for a long time it is only comparatively recently that it has come into prominence, and is called the New Cult. Though the paper refers to Cocoanuts, cocoa and other products, the opening of the land for coffee, tea, rubber and cereals is analogous. The object of drawing attention to the use of dynamite in all lands being opened in Southern India is to inculcate the value of deepening the land below the existing hard pan and loosening and fissuring the soil below for the benefit of the roots. In connection with this same object, we publish from the *Indian Planters' Gazette* a very interesting letter on an experiment made on a tea estate under cultivation.

"Blasting the subsoil by means of dynamite cartridges has in the United States of America within the past few years more than doubled the crops in all localities when they have been used. Fruit trees planted in dynamited holes at three years old are finer and healthier than those of six years planted by the spade, for this tool packs the earth round the roots and retards growth, while corn grown in land prepared by dynamite has yielded over 200 bushels to the acre. The chief advantages claimed for the new cult are:—

Six feet in depth of disintegrated plant food for the tree, in place of eighteen inches given by the spade hole.

Loosening and aerating the soil, rendering it porous, in order that the young tree may absorb as much moisture as possible. Conservation of water is an absolute necessity for the roots.

All agricultural crops, more especially the Sugar-cane, have suffered extremely from insects and fungus diseases, consequent on the late severe drought. The explosion of dynamite loosens the earth for yards round the spot, kills all insects likely to injure the young tree, giving it that healthy start which is the best resistance against pest of all kinds.

THE COMPARATIVE SECURITY IN HANDLING DYNAMITE CARTRIDGES.

As there is considerable misconception about the danger of handling dynamite, I must preface this paper by some remarks on the comparative safety in the manipulation of this product. When cellulose, a carbohydrate, is treated with nitric acid, the action of which is increased by sulphuric acid, the mixture of these acids is known as *Nitroacid*. "Now when the Nitroacid is mixed with glycerine, it forms the high explosive called Nitro-Glycerine." If from 25 to 40 per cent. of this explosive is incorporated with the fine sand or infusorial earth called "Kieselguhr" wood-pulp and other harmless ingredients and made into cartridges (8 inches long by 1½ diameter ½ lb. in weight) this product is called dynamite, and the cartridges can be handled with absolute security if a few simple precautions are taken, as explosion can only be caused by the sharp percussion of a detonator. As a matter of fact they are not as dangerous as gasoline, carbide or gun-powder. It should here be noticed that the gases evolved by the explosion of dynamite are highly noxious to insect life, consisting as they do of approximately 45 per cent. Nitric oxide No. 12 per cent. carbon dioxide CO, and 35 per cent carbon monoxide CO. The cartridge becomes an object for much care and circumspection after the detonator has been affixed, and as

this is done just immediately before lowering into the bore-hole for blasting the danger is practically nil. In the U. S. A. where the use of dynamite for agricultural purposes was intimated over 20 years ago, the "cult" has been advancing by leaps and bounds, so that now nearly all up-to-date farmers have their own small magazine for dynamite.

There are over half a million people treating their lands with it daily and the percentage of accidents from its use was in 1910 only $\frac{1}{2}$ of 1 per cent. and they were all caused by extreme carelessness. When I was in New York in 1910 a tremendous explosion occurred at Jersey City causing the death of nearly 40 persons. It appears that a steam tug at a wharf alongside the railway lines was being loaded with black powder. An accident occurred on board, I believe the boiler blew up, the boat caught fire and subsequently the powder also. There happened to be several cars loaded with cases of the "Red Cross" dynamite cartridge of 50 lbs. each on the adjacent lines. These cars were completely wrecked and boxes scattered all over the tracks. Many of them were burst open and the contents thrown loosely about and not a single cartridge exploded. The experts said at the time, if the dynamite had gone off, the concussion would have blown away the lower half of Manhattan Island. This ought to be a pretty good proof of the immunity of these cartridges from accidents.

"PURPOSES" to which these cartridges can be profitably applied in Trinidad:—

Planting Cocoanuts, Cocoa and Fruit trees generally. Rejuvenating the same.

Close Subsoil-blasting for the destruction of insects and fungus pests, and doubling the out-put on sugar-cane, cotton and corn lands.

Stump-blasting.—New lands and pastures

Swamp-draining for lagoons and bogs.

Pipe-line Trenching for oil lines.

Road building for grading and trenching.

Boulder-blasting for breaking up rocks and opening up gravel and lime pits.

PLANTING COCOANUTS, COCOA AND OTHER FRUITS.

The action of dynamite cartridges loosens and aerates the soil rendering it porous in order that the young tree may absorb as much moisture as possible. Conservation of water is absolutely necessary for roots (especially with the dry wet seasons we are having). Soil which becomes so compact as to stop the air passages is too wet for most crops and needs drainage, for plant roots must be supplied with air, and soil must be porous for its free circulation. Few persons realize the depth of tree root expansion. A healthy fruit tree under normal conditions will send its roots 10 to 20 feet downwards in the soil to find food, but if it encounters at a depth of 4 or 5 feet a layer of *soil* hard pan it must spread out laterally 20 feet or more, and the result of this unnatural side-wise growth is that each tree in the field is compelled to go over the feeding supply of its neighbours. Result, starvation from want of proper nourishment, a lessened output of fruit and should drought intervene death of the tree from imperfect moisture in a thin feeding ground.

Too much stress cannot be laid upon the importance of having the subsoil broken up and pulverized in order that the tree roots may obtain a healthy downward growth. We all know the result of leaving a strong healthy plant in a pot that has become too small for it. When it is turned

and it is found to be pot-bound, that is full of callous and cramped roots. What then becomes of the "Consols of the East" or the "Cocoa dividends?" if the same conditions prevail more or less (which it undoubtedly does) to the trees in the plantation, as the ordinary spade-hole only opens up 12 to 18 inches of the soil, leaving a solid wall round the young plant? There are two methods in vogue for agricultural blasting, one by detonator and fuse which is the cheaper and more generally used for sub-soil blasting, and the other by electric fuse. By the latter system a number of cartridges can be exploded simultaneously, but the preliminary outlay for blasting machine and electric fuse is of course more expensive.

The field to be prepared for tree planting having been lined out and a picket placed at each distance where a planting hole is required, a bore-hole from 24 to 30 inches deep must be made with either an earth-auger or sharp iron crow-bar. A half pound dynamite cartridge primed with detonator, cap, and three feet of fuse is then lowered into the hole and gently but firmly tamped with moist but not wet dirt, by means of a wooden stick until the bore-hole is filled even with the surface. Care must be taken to tamp the earth as hard and firm as possible or the bore-holes may blow out and half the energy of the explosive be wasted. The demonstrator then lights the end of the fuse and retires some 30 paces to await eventualities. After the successful explosion each site will be found full of broken and pulverized earth ready for the young tree's reception.

N.B.—The Cartridge should not be primed until the bore-holes are ready, and they must be handled with gloves. If handled with the bare hands a headache will be the result.

RE-JUVENATING COCOA, COCONUT AND FRUIT TREES GENERALLY.

On most fruit plantations of a certain age, the manager will note that certain fields have gone back to him and that their return is variable and almost negligible. This he will possibly put down to old age but in the majority of cases it will be found, mal-nutrition. If he digs round and about his hide-bound trees, he will find an absolutely dry and inert soil of putty-like appearance, as devoid of nourishment as megas is of sugar. When the trees to be operated on are in an extremely poor condition the bore-hole should be made 6 feet from the tree, driven down 3 feet at an acute angle in the direction of its roots and therein a half dynamite cartridge (½ lb.) exploded. But for the cultivation of ordinary trees that have been yielding poorly (in all probability because the roots have stuck an impenetrable sub-soil.)

For cocoa trees, it will be advisable to bore the holes 3 feet deep for half cartridge (½ lb.) midway between the trees on diagonal lines and on.

Coconuts to bore the holes 3 feet deep for whole cartridges (1 lb.) midway between them on square lines.

Close sub-soil blasting, for the destruction of insects and fungus pests and doubling the out-put on sugar cane, cotton and corn lands.

That the comparatively poor ratoon crops reaped from sugar cane and pineapples is mainly due to the compactness of the soil beneath the depth to which the ordinary cultivation extends has been indubitably proved by the experts of the tropical agricultural stations of the U. S. A. This compactness is caused by the combined effect of moisture and pressure. Water cannot percolate the soil thoroughly in this condition, neither can air. Without aeration, the nitrogen in the land becomes unavailable and in red clay soils, the chemical state of the iron salts becomes unfavourable. No matter how thoroughly the top soil may have been tilled for the plants, in a few months to this inert, concrete condition (especially damp clay, low lying

soils) must the sub-soil come, unless it has been tile-drained, which is too expensive under present market conditions. Close dynamiting answers the same purpose as the sub-soil drain and its effects are good for ten years according to the returns of the Southern Planters' U. S. A., and they have been using the cartridges for a longer period. Experience has shown that the sub-soil in a given area of land will be thoroughly cracked up, if half cartridges are exploded in bore-holes ten feet apart both ways as these cracks will meet.

As regards insect pests, of course I have no records anent the frog-hopper, but I expect to get some other cane plagues from Louisiana and Hawaii. I have however a record from Georgia where "woolly Aphis" was known to abound. In orchards that have been dynamited, there is no evidence of their presence.

The most suitable time for dynamiting in cane lands would be dry season, especially for pieces to be kept as ratoons, preferably a month after cutting when the sprouts have begun to make a showing. The bore-hole must be dug straight down two feet at intervals of 10 feet (if the field is 5 x 5 lining) the first hole being made in the centre of the row and so on until the piece is finished. If stiff, moist clays a quarter cartridge (1/4 lb.) will be sufficient but light sandy soils will require a half cartridge. (1/2 lb.) There will not be the slightest chance of injury to the cane stoles, the field will be sub-soil drained, the larvae of the frog-hoppers destroyed by shock and the nitrous fumes of the gases and the out-put of sugar in all probability more than doubled at the subsequent reaping. I have just read Press Bulletin No. 38 (dated 25th October) 12, of the "HAWAII" Agricultural Experiment Station "HONOLULU." This contains an article on the "Use of Dynamite in Farming" by E. V. Wilcox, Special Agent in Charge. Therein he has stated that dynamite has been in use there for four years, and as Honolulu is in the same isotherm as Jamaica I will quote a couple of extracts. "For tree planting dynamite is confidently recommended as the best method of preparing the soil." "If the cost of dynamiting does not exceed 25.00 per acre it will thus be seen that this special mode of preparation is a profitable investment from the standpoint of the physical condition brought about in the soil and the subsequent increase in crop yield."

STUMP BLASTING FOR NEW LANDS.

In blasting stumps the amount of charge to be used and the position where it is to be placed will depend on local conditions such as nature of soil, and the way the roots of the stumps lie. It is generally advisable to place the bore-hole under the centre of the stump so that the middle part which naturally offers greatest resistance will be hit first and hardest. Stumps in heavy clay will require lighter charges than those in light sandy soil, and while it is preferable to blast damp clay land in dry weather, work done in light sandy soils will be more thoroughly accomplished when the earth is damp. In the United States a regular graded table has been formed as to the number of cartridges to be used according to the diameter of the stump ranging from 1 1/2 cartridges for 12" diameter up to 8 cartridges for 48" diameter all cartridges to contain 40 per cent. extra dynamite.

BLASTING TRENCHES FOR OIL PIPE LINES.

To blast a trench for laying oil-pipe lines a row of holes must be punched 1 1/2 inches in diameter at spaces of 2 feet apart, down to within 4 inches of the grade of the trench, and in such a position that the bottoms of the holes will follow the centre line of it. Into each hole a half cartridge 40 per cent. extra dynamite should be dropped and pushed firmly to the bottom with a wooden stick. When the holes have been punched for four or five

hundred feet, the charging of the holes should be started at the ends of the trench and finished at the middle. The three last holes should be charged with two cartridges each, and the last cartridge loaded in the middle hole should be primed with a blasting cap fuse. No Tamping required. Just as the primer is in position everybody should be warned off the trench, and the fuse lighted, the blaster of course retiring to a safe distance. The charge in the middle hole explodes those in the holes on either side, and the effect of these two is carried to the next ones, and so on almost instantaneously to the opposite ends of the ditch. In this way trenches can be dug up to 3 to 4 feet deep, 3 feet wide at the bottom and 5 to 7 feet wide at the top.

ROAD BUILDING FOR GARDENING AND TRENCHING.

Road-grading and trenching always takes more or less digging, but by using dynamite to loosen up the hard ground or shale, and to blast out the rocks they can be built quickly and at comparatively little expense. To blast cuts not more than 5 feet deep through hard earth or shale, a bar should be driven down to within 6 inches of grade and the bore-holes spaced from 5 to 9 feet apart. In each hole a primed extra 40 per cent. dynamite cartridge (4 lb.) placed, and the hole then thoroughly tamped. If it is necessary to cut through rock, the holes should be spaced a bit closer. In this way the material to be removed is not only broken up so that it can be shovelled very easily, but a good portion of it spread over the surrounding land and does not have to be handled.

The processes for swamp draining and boulder blasting are not quite so simple as the preceding operations and require wiring for electric fuses, and the use of the electric blasting machine.

Any person anxious for information under this head can apply to the writer, who will give all information.

COST.

I am not very able to state exactly what will be the cost per acre for the different varieties of cultivation in Trinidad as the freight and duty will have to be reckoned with. I am hoping to approach the Government for the remission of import duty, as there is really a great need for dynamite for general agriculture. Much of course depends on the distances at which the bore-holes will have to be sunk. Preparation of lands for Cocoanuts will be naturally cheaper than for Cocoa, sugar-cane, corn, cotton, etc. In the United States the cost per acre according to the different cultivations varies from \$10'00 to 25'90. This sounds expensive but a double return from the fields will show that the end justified the outlay.—*Agricultural Society of Trinidad and Tobago.*

Mr. J. Carson Parker, the Association's Representative on the Tea Cess Committee has written the following letter to the Chairman, and as time is pressing, suggestions should be forwarded as early as possible to the Secretary:—

Meppadi, 10th February, 1913.

C. E. ABBOTT, Esq.,
Chairman, U. P. A. S. I.
Meppadi.

Dear Sir,

I have to inform you that the Annual Meeting of the Indian Tea Cess Committee will be held on March 14th at Calcutta, and I shall be glad to know of any matter you want brought up at the Meeting.

Yours faithfully,
(Signed) J. CARSON PARKER.

TEA.

Dynamite in Tea Cultivation.

EXPERIMENTS AT SATHGAO TEA ESTATE.

Manile Bazaar, 30th January.

A most interesting and instructive demonstration took place at Sathgao Tea Estate, South Sylhet, on the 27th instant, where a large and representative number of the tea planters from the surrounding districts were entertained to luncheon by Captain and Mrs. Robert Fraser. The special object of the meeting was to witness a demonstration of sub-soil cultivation with dynamite. Messrs. Nobel's representative, Mr. Macqueen, conducted the experiments, and throughout the operations explained everything so clearly and simply that all who were in attendance could have no hesitation at any time in the future in undertaking similar work with dynamite. Hardpan must not exist if we are to have a top crop with a good quality tea. This is becoming to be so well understood amongst the planting community that it is almost accepted as a hard and fast rule. There are different kinds of hardpan depending upon the material of which they are composed. One kind of hardpan is a hard layer of clay which is sometimes found below the ordinary open sub-soil. Another is a kind of cemented gravel, and the one with which we are most familiar in the districts is composed of a mixture of "kanker" gravel set in a matrix of a red iron clay. We are, in the habit of calling it "laterite," a name which might apply to any kind of red soil, but as the nature and origin of true laterite is somewhat obscure, we may leave it at that.

There is one thing very certain: surface soil cultivation has a tendency to increase the impermeability of all kinds of hardpan. The continual surface cultivation assists the rain water to carry the finer portions of the soil in suspension downwards. When this finer part of the soil reaches below the usual cultivation it sticks there and assists very effectually in cementing any rougher material it comes amongst. As this goes on year after year it is not difficult to understand how a hardpan is formed even in a tea garden which is considered under fair cultivation. It is not so very many years ago when many planters believed that cultivation in any form, and more especially deep cultivation, during the cold weather was waste of money and labour. Now-a-days it is very noticeable that our very best gardens are those who go in for deep cold weather cultivation, and this has ^{as} fully been recognised as a necessity in up-to-date cultivation of tea that what is known as trench hoeing has been resorted to, and it is, all done with the object of breaking up the impervious layer of sub-soil to which we have given the name of "hardpan." Of course the ultimate object is to allow the roots of the tea bush as large a quantity of permeable soil after aeration, of supplying a larger amount of mineral food in an available condition. A bush having a large root range will not suffer so much in its quality. In the leaf product, represented by the manufactured article, when bulky nitrogenous manures are supplied, as one having a limited rooting volume of soil, the advantages of breaking up the hardpan and bringing the sub-soil into cultivation are so numerous and so generally understood by planters that it is unnecessary to recapitulate them and we will now proceed to describe the dynamite demonstration which took place for the purpose of showing how the roots of the tea bush can be allowed greater feeding space by the blasting of the hardpan.

THE DEMONSTRATION.

The demonstration took place amongst young tea in a clearance about two miles to the north of Sathgao factory. The main experiment took place

in this cultivation, but dynamite charges were also tried upon uncultivated fallow land, and the effects of the explosive were also shown in uprooting trees, etc. As the primary interest was in that part relating to the cultivation of tea land, the other secondary part need not be described, as it was merely undertaken to illustrate the power of the explosive under different conditions. Several sizes of charges were used, but in the cultivation 23 charges weighing two ounces each were inserted in drilled holes $2\frac{1}{4}$ feet deep. All the operations were clearly explained by the expert as they were performed. The cutting the fuse and the fastening on of the detonator were all shown and explained as the work was done. What to do and how to do it, what not to do and how to avoid all danger were equally as pointedly explained. No more people were supposed to be at the blasting operations than were absolutely necessary. Above all the detonators and cartridges must always be kept under lock and key. Children must not be allowed to take a detonator into their hands and they were very apt to get hold of them if they had the opportunity and their curiosity prompted them to find out what was inside. If the composition inside a detonating cap was pricked out the cap was certain to explode and the exploding of one of these caps had a force itself, entirely without the dynamite, sufficiently strong to shatter a man's hand to pieces, perhaps even worse might happen.

THE "MODUS OPERANDI."

When the holes were being loaded only a wooden rod for tamping had to be used, and it was explained that pounding or striking the charge whilst ramming home must be avoided, "it had only to be gently pushed down to the bottom of the hole. Rather use too long a fuse than a too short one, so as to give plenty of time to get to a safe distance before the explosion. If a shot missed fire, and when this was absolutely certain, the shot must not be untamped. Another hole must be bored a distance of not less than 12 inches away. The detonators must be made watertight when firing in wet holes.

The special kind of dynamite used is known as Nobels Palarite, Glig-nite of Farmers' Dynamite. Holes were drilled $2\frac{1}{2}$ feet deep at a distance of twelve feet apart and when all was ready for touching off a planter each took charge of a row. They commenced lighting the fuses from one end and they had all finished at the other in plenty of time to allow of them getting to a safe distance before the explosions took place. Any one standing at a distance of twenty yards was perfectly safe. When the charges went off there was merely a heavy muffled thud which could be very perceptibly felt underneath at a distance of twenty yards. The ground in the vicinity of the explosion heaved up and when the place was examined it was found that the shattered fragments of sub-soil had been forced up through the surface soil. When the spot was dug up the sub-soil showed numerous cracks in all directions and no doubt that the force of the explosion had opened up numerous channels for the free entrance of air and rain water.

THE DISCUSSION.

There was considerable discussion amongst those present but the general trend was towards its not being able to compete with manual labour as it exists in the tea districts. The cost per acre works about Rs.75 when the shots are inserted at distances of 12 feet apart. If the shots were effective at 18 feet apart it, of course, would reduce the expense considerably. It would require further practical experiment by the planters themselves to find out when, where and how the explosives could be advantageously used. After the demonstration the company adjourned to the Sathgao bungalow for tea where the discussion was further continued.—*Englishman*, 3-2-13.

CARDAMOMS.

After some years of depression, we learn with pleasure that the price of cardamoms this year has gone up, so we take from Messrs. Schimmel and Co.'s semi Annual Report the following :—

The Cardamoms of British Commerce are all derived from *Elettaria Cardamomum*, Maton, N. O. Zingiberaceae which grows wild and is cultivated on the Malabar Coast and Ceylon. There is a large market for the spice in Calcutta ; the annual consumption in India and Burma is computed to be nearly 1,000,000 lbs. Formerly scarcely any other than Malabar Cardamoms were imported into Britain but the Mysore variety now affords most of the fine quality. The latter plant possesses a more robust habit and bears exposure better than the Malabar type. It is not known how the district name " Mysore " came to designate the variety of a cardamom plant. There appears to be two varieties of Malabar plants, var. *minus* being confined to Southern India and var. *major* growing in Ceylon. The latter is distinguished by its shorter stems, broader leaves and more globose fruit. In the shady mountain forests of Canara, Cochin and Travancore the cardamom plant grows between the altitudes of 2,500 and 5,000 feet. The plant is best suited to a rich, moist, loamy soil protected from strong winds. These conditions are met with in the betel-nut and pepper gardens of Mysore and of Canara and also in the cultivated cardamom valleys of Ceylon.

In the forest district of Coorg (Mysore) the cardamom gardens are laid out in February or March, simply by making clearings in the forest, a space of some 20 to 30 yards of jungle being left between the gardens. Superstition plays an important part, felling of the trees being only permissible on certain days of the week and before noon. The natives also believe that the presence of such plants as ebony, nutmeg and pepper favourably affect the development of the cardamom plants. In the fifth year a full crop is produced. After seven years more, the plant becomes sickly. Some of the large trees in the jungle-screen surrounding the fields are felled ; the falling trunks kill many of the cardamom stems, thus stimulating the rhizomes to produce new shoots, thereby renewing the producing capacity of the plot another eight years, when the process of renovation is repeated.

In Ceylon the cultivation is carried out much more systematically. The favourite cardamom districts are Matale, Medamahanwara and Hewahata. The undergrowth of the land intended for a cardamom plantation is cleared, holes are dug 1½ to 2 feet wide, 12 inches to 15 inches deep and 7 feet apart in rows at a similar distance. The bulbs must not be planted too deep or they will rot. The use of seedlings instead of bulbs is increasing, however, the Mysore variety being most frequently grown from seed. Curiously enough only a small proportion of the seed germinates.

In Ceylon the plants flower almost all the year round ; picking being at the end of August and continues until April. The fruit is carefully dried by exposure to the sun or in wet weather by artificial heat. Machines for removing the calyx tube and the stalk have been introduced, and after passing through these the capsules are guarded and treated with sulphur vapour.

A table given at the end of the article shows that the cultivation of cardamoms in Ceylon has been steadily increasing. In 1911 the area and export were 7,300 acres and 564,819 lbs. In 1910, they were 7,426 acres and 639,007 lbs.

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Contents.

The Entomologist to the Government of Madras, concludes his very interesting report with a description of the methods by which he hopes to arrive at a solution of the question of the pollination of coffee. Very minute details are given of the means to ensure success, and we are sure his efforts will be whole-heartedly supported by those who are selected to assist him in this very interesting experiment. The whole planting community will await the outcome and the final report with hopeful anxiety, and wish it all success. It may have far reaching results.

Many travellers in India have said that they considered Coorg the prettiest part of India and when it becomes more accessible, when the Railway runs through the country, will be more frequently visited by those in search of the picturesque. That rubber is becoming a very paying industry will delight those who have seen this small country—at one time almost entirely dependent on its coffee industry.

With agriculture (to be successful now-a-days) so dependent on the aid of science, Universities and Colleges are turning out Scientists to help the agriculturists are everywhere advocated, and we reproduce an article from *Nature* dealing with this important subject.

The Government Entomologist of Ceylon in his report describes some of the pests to which rubber is subject which if not nipped in the bud may cause great damage and loss to the planter. This is another case in which the Scientist is so necessary to differentiate between the harmless and harmful beetle.

Messrs. Stenning, Inskip & Co.'s circular is published as it contains much useful information to the Tea planter. To Coffee planters the French Parliamentary Report should prove interesting, dealing as it does with the valorized coffee and attention is specially drawn to the para. on "Free admission of Colonial (French) Coffee", and it will be noted that the French Colonial Coffee is protected highly against foreign grown coffee.